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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/577,179	01/09/2007	Virgil L. Woods	SDUC1160-1 (041673-3603)	4048

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EXAMINER	
DEJONG, ERIC S	

ART UNIT	PAPER NUMBER
1631	

MAIL DATE	DELIVERY MODE
01/05/2011	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/577,179	WOODS ET AL.	
	Examiner	Art Unit	
	ERIC S. DEJONG	1631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 October 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-44* is/are pending in the application.

4a) Of the above claim(s) *8-20,22,23 and 27-31* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7,21,24-26 and 32-38* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 April 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *07/02/2007*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED OFFICE ACTION

Applicant's response filed 10/05/2010 is acknowledged.

Election/Restrictions

Applicant's election with traverse of Group I (claims 1-38) and Species A (claims 5-7) in the reply filed on 10/05/2010 is acknowledged.

Applicant's election with traverse of the election of Group I and the species election of Species A in the reply filed on 10/05/2010 is acknowledged. The traversal is on the ground(s) that a search of one group of invention would require a search of the other identified Groups of invention. No arguments were indentified in applicants response directed to traversal arguments of the identified species.

In response, applicant's arguments are not found persuasive because the instant application is a national stage entry of a PCT filing. The basis of the instant election requirement is one of a Lack of Unity, wherein the indentified groups of invention are differentiated on the basis of a corresponding special technical feature. Applicants arguments, however, are directed to the burden of search of each indentified group of invention. While such arguments may be meritorious with regard to a restriction based on U.S. restriction requirements, such arguments are not germane with regard to a restriction based on Lack of Unity practice. Therefore, applicants arguments are not persuasive with respect to the election requirement, mailed 09/13/2010, based on Lack of Unity practice.

The requirement is still deemed proper and is therefore made FINAL.

Claims 1-44 are pending. Claims 39-44 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Further, claims 8-20, 22, 23, and 27-31 are withdrawn from further consideration as being directed to nonelected species of invention. Applicant timely traversed the restriction (election) requirement in the reply filed on 10/05/2010. Claims 1-7, 21, 24-26, and 32-38 are currently under examination.

Information Disclosure Statement

The information disclosure statement (IDS) submitted on 07/02/2007 has been considered by the examiner.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-7, 21, 24-26, and 32-38 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

The instant claims are drawn to a method of three dimensional structure prediction. The recited process comprises the abstract steps of comparing calculated amide rates of hydrogen exchange for a set of predicted possible structures based on experimental hydrogen exchange analysis and identifying one or more structures from

sad set having a calculated exchange rate profile that closely matches the experimental profile. Further recited embodiments include a calculated exchange rate of hydrogen that use thermodynamic parameters for each amino acid in a protein of interest. The instant claims only recite the abstract comparing and identification steps that do not require any physical step nor do they involve any transformation of a physical article into a different state or thing. The instant claims do not recite any positive, active step involving the collection of hydrogen exchange rate data derived from a real world protein, but instead recite on the use the data resulting from such experimentation. Rather, the instant claims require only the abstract consideration of calculated hydrogen exchange data, per se, with empirically derived data hydrogen exchange data. Further, the step of identification structures only requires the abstract correlation between calculated and empirically hydrogen exchange rate profiles. The instant claims no not recite any positive limitation directed to the apparatus or machine elements required in order to practice the recited process and, therefore, lack any tie to a particular machine or apparatus. For these reasons, the instant claims are directed to non-statutory subject matter.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1 and 32-35, 37 and 38 are rejected under 35 U.S.C. 102(e)(2) as being by Hilser et al. (US Patent No. 7,027,969 (filed Aug. 29, 2002).

The instant claims are drawn to a method of three dimensional structure prediction. The recited process comprises the abstract steps of comparing calculated amide rates of hydrogen exchange for a set of predicted possible structures based on experimental hydrogen exchange analysis and identifying one or more structures from sad set having a calculated exchange rate profile that closely matches the experimental profile. Further recited embodiments include a calculated exchange rate of hydrogen that use thermodynamic parameters for each amino acid in a protein of interest.

Hilser et al. sets forth methods related to predicting pKa of a protein, pH stability of a protein and electrostatic interactions of a protein. Hilser et al. teaches the generation of a plurality of partially folded, ensemble states of a protein of interest (see Hilser et al., col. 1, lines 63-65 and col. 7, lines 28-35). Hilser et al. further teaches the calculation of a protected and exposed regions of a given ensemble structure based on predicted hydrogen exchange rates at each residue position with respect to solvent

exposure (see Hilser et al. col. 8, line 9 through 7, lines 3-14 and col. 9, lines 61 through col. 10, line 30). Hilser et al. further teaches that the positions in proteins capable of undergoing observable hydrogen exchange result from known, labile hydrogen positions present in amino acids making up any given protein sequence (see Hilser et al., col. 7, lines 3-26). Hilser et al. further teaches the incorporation of thermodynamic considerations (see Hilser et al., col. 9, lines 25 through col. 10, line 30). Hilser et al. further teaches embodiments wherein the above described computational procedure is used characterize hypothetical structure of ensembles and identifying and designing real world proteins that exhibit the predicted characteristics of said calculated ensembles (see Hilser et al., col. 10, line 35 through col. 12, line 30).

With regard to dependent claim 32, Hilser et al. teaches the use on NMR to obtain experimental hydrogen exchange data (see Hilser et al., col. 1, lines 29-39)

With regard to dependent claim 33-35, Hilser et al. teaches the generation of all possible combination of ensembles, of incrementally different conformational states, of a protein of interest (see Hilser et al., col. 10, lines 40-54).

With regard to dependent claim 37, Hilser et al. expressly teaches the use of the COREX algorithm (see col. 7, lines 29-35 and col. 8, lines 55 through col. 9, line 24).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1 and 32-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hilser et al. (US Patent No. 7,027,969 (filed Aug. 29, 2002) in view of Simons et al. (1999).

Hilser et al. is relied upon for the teachings directed to methods related to predicting pKa of a protein, pH stability of a protein and electrostatic interactions of a protein as set forth in the above rejection under 35 USC 102(e). While Hilser et al. teaches the determination of a plurality of ensemble structures for a protein of interest, Hilser et al. does not expressly teach the use of the Rosseta algorithm in such structure prediction.

Simons et al. is relied upon for teaching the use of ROSSETA for the determination of protein structure (see Abstract and throughout). Further, Simons et al. teaches that the ROSSETA approach makes ab initio structure prediction of small proteins computationally feasible.

Therefore, it would have been obvious to one of having ordinary skill in the art to rely upon the structure prediction algorithm ROSSETA, as taught by Simons et al., to calculate ensemble structures of a protein of interest, as taught by Hilser et al. On of skill in the art would recognize that the ROSSETA approach for ab initio structure

determination is well suited for structure prediction of small proteins where the need for consideration of local interactions are critical, which aligns with the requirement for determining a plurality of ensemble structures of Hilser et al. from a larger protein of interest.

Claims 1-7, 21, 24-26, 32-35, 37, and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hilser et al. (US Patent No. 7,029,969).

Independent claim 1 is directed process comprises the abstract steps of comparing calculated amide rates of hydrogen exchange for a set of predicted possible structures based on experimental hydrogen exchange analysis and identifying one or more structures from sad set having a calculated exchange rate profile that closely matches the experimental profile. Further, independent claim 38 recites a further embodiment that includes consideration of a calculated exchange rate of hydrogen that uses thermodynamic parameters for each amino acid in a protein of interest.

Dependent claims 2-7, 21, 24, 25, and 26 each recite limitations directed to specific experimental procedures used to derive the experimental hydrogen exchange data that is relied upon in the “analysis” step of independent claim 1. However, since independent claim 1 does not recite any physical experimentation step, the recited limitations directed to specific experimental procedures do not alter the scope of the claim except respect to the content of the data used in said “analysis” set forth in independent claim 1.

Hilser et al. is relied upon for the teachings directed to methods related to predicting pKa of a protein, pH stability of a protein and electrostatic interactions of a protein as set forth in the above rejection under 35 USC 102(e). While Hilser et al. is relied upon for teaching the generation of ensemble structures of a protein of interest, the calculated amide hydrogen exchange rates therefor, and an analysis involving the comparison calculated rates to empirically derived hydrogen exchange rates in order to identify one or more real world proteins that correspond, Hisler et al. does not expressly teach the experimental steps or procedures as set forth in dependent claims 2-7, 21, 24, 25, and 26.

The recited empirical procedures set forth in claims 2-7, 21, 24, 25, and 26 only serve to modify the content of the data used in the analysis step of independent claim 1, since claims 1 does not recite any physical step involving the actual performance of an experiment but rather the analysis of the data resulting therefrom. As such, the embodiments of claimed invention set forth in claims 2-7, 21, 24, 25, and 26 and differ from the invention set forth by Hisler et al. only by the content of data used in the analysis of hydrogen exchange between calculated and empirically determined hydrogen exchange rates.

The MPEP states in 2106.01:

> When nonfunctional descriptive material is recorded on some computer-readable medium, in a computer or on an electromagnetic carrier signal, it is not statutory and should be rejected under 35 U.S.C. 101. In addition, USPTO personnel should inquire whether there should be a rejection under 35 U.S.C. 102 or 103. USPTO personnel should determine whether the claimed nonfunctional descriptive material be given patentable weight. USPTO personnel must consider all claim limitations when determining patentability of an invention over the prior art. In re Gulack, 703 F.2d 1381, 1385, 217 USPQ 401, 403-04 (Fed. Cir. 1983). USPTO personnel may not disregard claim limitations comprised of printed matter. See Gulack, 703 F.2d at 1384, 217 USPQ at 403; see also Diehr, 450 U.S. at 191, 209 USPQ at 10. However, USPTO personnel

> need not give patentable weight to printed matter absent a new and unobvious functional relationship between the printed matter and the substrate. See In re Lowry, 32 F.3d 1579, 1583-84, 32 USPQ2d 1031, 1035 (Fed. Cir. 1994); In re Ngai, 367 F.3d 1336, 70 USPQ2d 1862 (Fed. Cir. 2004).

The difference between Hisler et al. and the claimed invention constitutes non-functional descriptive material because the content of the hydrogen exchange data does not alter the function of the recited “analysis”, which requires only a matching between calculated and experimentally determined amide hydrogen exchange rates. Therefore, no patentable weight is given to the content of the database on the claimed computer system and its method of use.

For the benefit of applicants, the examiner recommends that the independent claims in the instant application be amended so as to recite an active, physical step wherein empirical measurements are performed. Such would provide a sufficient antecedent basis in the independent claims that would be further modified and limited by the empirical limitations set forth in dependent claims 2-7, 21, 24, 25, and 26. In the current form, claims only modify the content of data used in the analysis of independent claim 1 since no positive, physical step is recited therein.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ERIC S. DEJONG whose telephone number is (571)272-6099. The examiner can normally be reached on 8:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marjorie Moran can be reached on (571) 272-0720. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/ERIC S. DEJONG/
Primary Examiner, Art Unit 1631